LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory June 2-6, 2014.

NATIONAL GEOGRAPHIC DATING IVORY FOR FORENSICS

Livermore researchers have dated confiscated ivory to determine if it is from slaughtered elephants before or after the 1990 global ban on international ivory trade.

Prosecutors in the tiny West African country of Togo employed some of the world's most advanced forensic technology in making their case against accused ivory trafficker Edouodji Emile N'Bouke.

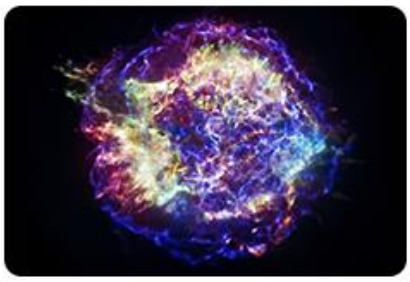
N'Bouke insists his ivory was imported long before a global ban on international ivory trade went into effect in 1990.

Not so, said the prosecutors, and they turned to Lawrence Livermore for the forensic analysis.

Radioisotope analysis conducted by Lawrence Livermore researchers at the Center for Accelerator Mass Spectrometry showed that N'Bouke's stockpile included ivory from elephants killed after 1990, and possibly killed as recently as 2010.

To read more, go to *National Geographic*.

A TABLE TOP LIKE NO OTHER



Lawrence Livermore scientists participated in an experiment to re-create a supernova, like Cassiopeia A, shown above.

Laser beams 60,000 billion times more powerful than a laser pointer have been used to re-create scaled supernova explosions in the laboratory as a way of investigating one of the most energetic events in the universe.

Supernova explosions, triggered when the fuel within a star reignites or its core collapses, launch a detonation shock wave that sweeps through a few light years of space from the exploding star. But not all the explosions are alike, and some, such as Cassiopeia A, show puzzling irregular shapes made of knots and twists.

To investigate what may cause these peculiar shapes, an international team including researchers from Lawrence Livermore devised a method of studying supernova explosions in the laboratory instead of observing them in space.

The experiment demonstrated that as the blast of the explosion passes through the grid, it becomes irregular and turbulent just like the images from Cassiopeia A.

To read more, go to *Nanowerk*.

The Christian Science Monitor

GOING UNDERGROUND WITH CARBON DIOXIDE

The In Salah central processing facility (CPF) in Algeria captured and stored carbon dioxide before the gas was piped to the national gas grid.

A facility in Algeria that captured carbon dioxide on an industrial scale -- and locked it up deep underground -- is yielding a lesson for researchers exploring ways to deal with global warming: Select a site with care, because the unexpected can happen.

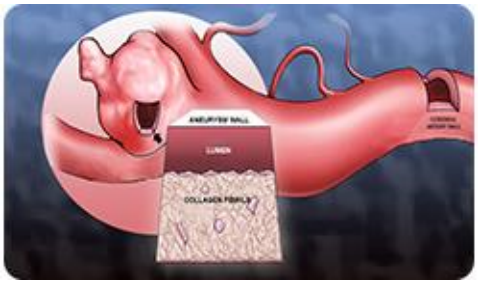
A new study by Lawrence Livermore researchers aims to explain why sequestered CO2 was moving surprisingly quickly through rock formations beneath In Salah, a natural-gas extraction site in central Algeria. In Salah hosted the second-largest industrial-scale sequestration demonstration project after Norway's Statoil.

The study of In Salah's effort identifies the injected CO2 itself as a key culprit. The facility was injecting the unwanted greenhouse gas at a rate that boosted the pressure of the CO2 stored in a sandstone formation more than 6,000 feet below the surface.

To read more, go to *The Christian Science Monitor*.

Medical Xpress

BURSTING RESEARCH ON ANEURYSMS



A cerebral aneurysm is a blood-filled bulge formed in response to a weakness in the wall at branching brain arteries. If the bulge bursts, the person can undergo a brain hemorrhage, which is a subtype of stroke and a life-threatening condition.

New research by an international consortium, including a researcher from Lawrence Livermore National Laboratory, may help physicians better understand the chronological development of a brain aneurysm.

Using radiocarbon dating to date samples of ruptured and unruptured cerebral aneurysm (CA) tissue, the team found that the main structural constituent and protein -- collagen type I -- in cerebral aneurysms is distinctly younger than once thought.

The new research helps identify patients more likely to suffer from an aneurysm and embark on a path toward prevention.

To read more, go to *Medical press*.

TMCnet.com MILLIONS AND MILLIONS OF COMPUTING HOURS

An LLNL research team earned a 2014 Leadership Computing Challenge Award of 30 million CPU hours on Oak Ridge National Laboratory's Titan Cry XK7 supercomputer.

A team of researchers led by Andreas Kemp has received a 2014 Leadership Computing Challenge award from the DOE Office of Advanced Scientific Computing Research (ASCR) to further pursue the study of short-pulse laser interactions with solid density plasmas using supercomputer simulations.

The research project has been awarded 30 million CPU hours on the Titan Cray XK7 supercomputer at Oak Ridge National Laboratory, the world's second fastest supercomputer in Tennessee. The ASCR Leadership Computing Challenge awards provide large computing time allocations on leadership-class supercomputer systems for projects of interest to DOE.

The award will allow for large-scale simulations to be performed in support of Kemp's 2012 DOE Early Career Research Program award. Kemp's collaborators include LLNL researchers Frederic Perez, Bruce Cohen, Laurent Divol, Prav Patel and University of Nevada, Reno professor Yasuhiko Sentoku.

To read more, go to *TMCnet.*

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send e-mail